ENVIRONMENTAL CONDITIONS

METEOROLOGY/AIR QUALITY

Folsom Lake State Recreation Area

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by

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METEOROLOGY/AIR QUALITY

Introduction

This summary documents the meteorological conditions and air quality in the vicinity of the Folsom Lake State Recreation Area (the Unit). These conditions have a direct impact on Unit visitors' pursuit of outdoor recreation activities. The purpose of this summary is to:

- Describe the climatic conditions that influence land use decisions and the potential siting of future recreation facilities (i.e. marina, campgrounds)
- Outline the regulatory framework that determines impacts to air quality from the Unit and the surrounding region

The climatic information presented here is derived primarily from the Western Regional Climate Center's website. Air quality data and thresholds come from both State and regional agencies, including the California Air Resources Board, El Dorado County Air Pollution Control District, Placer County Air Pollution Control District and Sacramento County Air Management District. No fieldwork was performed to produce this summary.

Climate

General Description

The weather patterns of the region, the wind speed and direction, and the temperature profile of the atmosphere will affect the air quality of a given area, in addition to the amount of air pollutants emitted locally or within the air basin. The amount of humidity and sunlight each day determines the fate of the emitted pollutants and the resulting concentrations of air pollutants that define "air quality."

The Folsom Lake State Recreation Area is located within the following three counties: Sacramento, Placer, and El Dorado. It is also located within two air basins: Mountain Counties Air Basin (El Dorado County) and Sacramento Valley Air Basin (Sacramento and Placer Counties). The following discusses the climatological conditions within the two air basins and the subarea in which the Unit is located.

Regional Climate

Sacramento Valley Air Basin.

The Sacramento Valley Air Basin (SVAB) occupies approximately 15,040 square miles and encompasses the boundaries of the following counties: Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, including the eastern portion of Solano County and the western, urbanized portion of Placer County.

Air quality in the SVAB is heavily influenced by weather conditions. Winters in the SVAB are generally wet and cool; summers are hot and dry. The SVAB is bounded to the north by the Cascade mountain range, to the east by the Sierra Nevada mountain range, and to the west by the Coastal Range. Wind from the coastal area is channeled along these ranges and in the process transports pollutants from one air basin to another. The coastal wind flows northward from south of Sacramento County transporting pollutants from the Sacramento metropolitan area into Placer County and other northern counties. The primary source of emissions in the Sacramento metropolitan area is on-road vehicles.

The vertical dispersion of air pollutants in the SVAB is limited by the presence of persistent temperature inversions. Typically, expansional cooling of the atmosphere causes air temperature to decrease with altitude. An inversion is a reversal of this atmospheric state. In an inversion, the air temperature increases with height. Inversions can exist at the surface or at any height above the ground. Warm air above the inversion base is less dense than cooler air below the inversion base, therefore, the inversion base represents an abrupt density change. This difference in air density prevents air above and below the inversion base from mixing. The elevation at which the base of the inversion occurs is known as the "mixing height." This is the level up to which pollutants can mix vertically.

Inversion layers are significant in determining ozone formation because they limit the amount of mixing space available for air particles. Under an inversion, ozone and its precursors will mix and react with greater frequency, producing higher concentrations of pollutants in the air. The inversion will also simultaneously trap and hold directly emitted pollutants such as carbon monoxide (CO). Particulate matter (PM_{10}) is both directly emitted and indirectly created in the atmosphere as a result of chemical reactions, as such, its levels are increased under an inversion.

During the night, surface or radiation inversions are formed when the ground surface becomes cooler than the air above it. On clear nights, the Earth's surface goes through a radiative process in which heat energy is transferred from the ground to a cooler night sky. As the Earth's surface cools during the evening hours, the air directly above it also cools, while air higher up remains relatively warm. The inversion is destroyed when heat from the sun warms the ground, which in turn heats the lower layers of air; this heating stimulates the ground level air to float up through the inversion layer.

The combination of stagnant wind conditions and low-level inversions produces the greatest pollutant concentrations. On days with high wind and/or no inversions, ambient air pollutant concentrations are lowest. Periods of low-level inversions and reduced wind speeds give rise to high concentrations of CO and PM_{10}. In the winter, extremely low-level inversions and air stagnation during the night and early morning hours produce the greatest pollution problems related to CO and oxides of nitrogen. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and oxides of nitrogen to form photochemical smog.

Sacramento County.

Part of the Unit area is located within Sacramento County. This portion of the Unit is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). Sacramento County is located at the southern end of the Sacramento Valley, which, as stated

earlier, is bounded by the Coast and Diablo Ranges on the west and the Sierra Nevada Range on the east. The County is 55 miles northeast of the Carquinez Strait, a sea-level gap between the Coast Range and the Diablo Range; the intervening terrain is flat.

The prevailing wind in Sacramento County is from the south due to marine breezes through the Carquinez Strait. During winter, however, sea breezes diminish and winds from the north occur more frequently.

Between late spring and early fall, a layer of warm air often covers a layer of cool air from the Delta and San Francisco Bay, resulting in an inversion. Typical winter inversions are formed when the sun heats the upper layers of air, trapping cooler air that has been in contact with the colder surface of the Earth throughout the night. Although different inversion types predominate at certain times of the year, both types can occur at any time. Local topography gives rise to many variations that can affect the inversion base and thus influence local air quality.

Placer County.

The Unit area is partially located in the SVAB portion of Placer County. Air quality in this portion of the Unit area is under the jurisdiction of the Placer County Air Pollution Control District (PCAPCD).

Moderate dry days and cool nights characterize the summer months in Placer County. During the summer, the temperature varies between the low-lying valley and high country areas. Typically, valley temperatures are higher than mountain temperatures. The rainy season in Placer County occurs between November and April, but excessive rainfall and damaging windstorms are rare.

Mountain Counties Air Basin.

The Mountain Counties Air Basin (MCAB) is comprised of Plumas, Sierra, Nevada, Placer (middle portion), El Dorado (western portion), Amador, Calaveras, Tuolumne, and Mariposa Counties. The MCAB lies along the northern Sierra Nevada mountain range, close to or contiguous with the Nevada border, and covers an area of roughly 11,000 square miles.

The climate of the MCAB is influenced by the foothill and mountainous terrain unique to the counties included in the MCAB. The general climate of the MCAB varies considerably with elevation and proximity to the Sierra ridge. The terrain features of the MCAB make it possible for various climates to exist in relatively close proximity. The pattern of mountains and hills causes a wide variation in rainfall, temperature, and localized winds throughout the MCAB. Temperature variations have an important influence on basin wind flow, dispersion along mountain ridges, vertical mixing, and photochemistry. In the winter, the Sierra Nevada Range receives large amounts of precipitation from storms moving in from the Pacific. In the summer, it receives lighter amounts of precipitation from intermittent “monsoonal” moisture flows from the south and cumulus buildup. Precipitation levels are high in the highest mountain elevations but decline rapidly toward the western portion of the MCAB. Winter temperatures in the mountains can be below freezing for weeks at a time and substantial depths of snow can accumulate, but in the western foothills, winter temperatures rarely dip below freezing and precipitation is mixed as rain or light snow. In the summer, temperatures in the mountains are mild, with daytime peaks in the 70s to low 80sEF, while temperatures in the western end of El Dorado County can routinely exceed 100E F.

Due to the combination of topography and meteorology of the MCAB, local conditions predominate in determining the effect of emissions in the MCAB. Regional air flows are affected by the mountains and hills, which direct surface air flows, cause shallow vertical mixing and hinder dispersion, creating areas of high pollutant concentrations. Inversion layers, in which warm air overlays cooler air, frequently occur and trap pollutants close to the ground. In the winter, these conditions can lead to CO "hotspots" along heavily traveled roads and at busy intersections. During summer's longer daylight hours, stagnant air, high temperatures, and plentiful sunshine provide the conditions and energy necessary for the photochemical reaction between reactive organic compounds (ROG) and oxides of nitrogen (NOx). This reaction results in the formation of ozone (O_3). Because of its long formation time, ozone is a regional pollutant rather than a local hotspot problem.

In the summer, the strong upwind valley air flowing into the MCAB from the Central Valley to the west is an effective transport medium for ozone precursors and for ozone generated in the Bay Area and the Sacramento and San Joaquin Valleys. These transported pollutants are the predominant cause of ozone in the MCAB and are largely responsible for the exceedances of the State and federal ozone Ambient Air Quality Standards (AAQS) in the MCAB. The California Air Resources Board (ARB) has officially designated the MCAB as "ozone impacted" due to transport from those areas.

El Dorado County.

Part of the Unit area lies within the MCAB portion of El Dorado County. El Dorado County has two distinct air quality settings, which have been recognized formally by division of El Dorado County into two separate air basins: the Mountain Counties Air Basin and the Lake Tahoe Air Basin. El Dorado County is bordered by Sacramento Valley to the west and the State of Nevada to the east. The western area of El Dorado County consists of rolling foothills and the central and eastern areas of El Dorado County contain the Sierra Nevada mountain range.

The western slope of El Dorado County, from Lake Tahoe on the east to the Sacramento County boundary on the west, lies within the MCAB. Elevations range from over 10,000 feet at the Sierra crest down to several hundred feet above sea level at the Sacramento County boundary. Extreme slopes and differences in altitude characterize the rugged mountain peaks and valleys of the Sierra Nevada Range; rolling foothills characterize the land in the west.

The climate of El Dorado County is marked by hot, dry summers and cool, moist winters. The western portion of El Dorado County has higher temperatures and lower annual rainfall than the central and eastern portions, which are characterized by low temperatures and high annual rainfall.

Although movement of air is generally considered an effective means of diluting air pollution and subsequently attenuating the pollutant's unhealthy effects, predominant westerly winds during the summer transport urban air pollution from the west and southwest to the MCAB. This effect can contribute significantly to the region's inability to attain mandated air quality standards. The movement of urban pollution from the San Francisco Bay area to the foothills of the Sierra Nevada by means of the Carquinez Straits has been documented and may account for a sizable portion of regional foothill ozone levels.

Climatic Record

Regional Climatic Records

The Western Regional Climate Center (WRCC) collects and keeps climatological data at various stations throughout Northern California and the western United States. The following are a summary of the climatic data in the Sacramento County area.

Table M-1 lists the average wind speed, in terms of miles per hour, measured at five airports in the Unit vicinity. The measured wind speed data show that annual average wind speed in the Unit area ranges from 5.9 to 7.8 mph.

Table M-2 lists the mean monthly and annual number of cloudy days in the Sacramento area. Cloudy days range from 1 day a month in July and August to 19 days a month in January, with an annual total of 100 days.

Table M-3 lists the mean monthly and annual number of clear days in the Sacramento area. Clear days range from a low of 7 days in January to 27 days in July.

Table M-4 lists the mean monthly and annual number of days with heavy fog in the Sacramento area. Days with heavy fog range from none at all in June and July to 10 days in January and December, with an annual total of 34 days.

Table M-5 lists the mean monthly and annual percent relative humidity in the morning in the Sacramento area. Percent relative humidity in the morning ranges from a low of 76 percent in July to 90 percent in January and December, with an annual average of 82 percent.

Table M-6 lists the mean monthly and annual percent relative humidity in the afternoon in the Sacramento area. Percent relative humidity in the afternoon ranges from a low of 28 percent in July to 70 percent in January and December, with an annual average of 45 percent.

Table M-1: Average Wind Speed, mph

Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1[1]	7.7	8.1	7.5	8.0	7.9	8.7	8.8	8.5	7.4	6.8	6.3	7.9	7.8
2[2]	6.8	6.9	7.1	8.1	8.0	8.6	8.4	7.3	6.3	5.8	5.3	5.9	7.0
3[3]	7.0	7.4	7.2	7.9	7.9	8.4	8.1	7.6	6.6	6.3	5.9	6.6	7.2

Source: WRCC Web Site, 2002.

Table M-2: Mean Monthly and Annual Number of Cloudy Days in Sacramento County

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
19	13	12	8	5	2	1	1	2	6	12	17	100

Source: WRCC Web Site 2002.

[1]Data taken from McClellan Air Force Base, Sacramento, CA.

[2]Data taken from Sacramento Executive Airport, CA.

[3]Data taken from Sacramento International Airport, CA.

Table M-3: Mean Monthly and Annual Number of Clear Days in Sacramento County

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
7	8	10	12	17	22	27	26	24	19	10	8	188

Source: WRCC Web Site 2002.

Table M-4: Mean Monthly and Annual Number of Days with Heavy Fog in Sacramento County

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
10	5	2	1/2	1/2	0	0	1/2	1/2	1	5	10	34

Source: WRCC Web Site 2002.

Table M-5: Mean Monthly and Annual Percent Relative Humidity (Morning) in Sacramento County

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
90	87	84	82	81	78	76	78	77	80	86	90	82

Source: WRCC Web site 2002.

Table M-6: Mean Monthly and Annual Percent Relative Humidity (Afternoon) in Sacramento County

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
70	59	53	43	35	31	28	29	31	38	58	70	45

Source: WRCC Web Site 2002.

Weather Station Operations in the Unit Vicinity

The following weather stations operated by the WRCC are in the vicinity of the Unit: Folsom Dam, Rocklin, Auburn, Colfax, Georgetown Ranger station, Placerville, and two Sacramento stations.

Weather data available at the Folsom Dam station covers the period between October 26, 1955, to April 30, 1993. The monthly average maximum temperature ranged from 53.7EF in January to 94.5EF in July, with an annual average maximum of 74.1EF. The monthly average minimum temperature ranged from 37.9EF in January to 60.3EF in July, with an annual average minimum of 49.4EF. Monthly average total precipitation ranged from 0.09 inches in July to 4.43 inches in January, with an annual average total of 23.92 inches. A monthly average of total snowfall of 0.1 inch was recorded for the month of January and the annual total at this station. Table M-7 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Folsom Dam station.

Weather data available at the Rocklin station covers the period between July 1, 1948, to June 30, 1976. The monthly average maximum temperature ranged from 52.9EF in January to 97.2EF in July, with an annual average maximum of 74.6EF. The monthly average minimum temperature ranged from 33.3EF in January to 57.6EF in July, with an annual average minimum of 44.8EF. Monthly average total precipitation ranged from 0.06 inches in August to 4.74 inches in January, with an annual average total of 22.27 inches. A monthly average of 0.2 inches of snowfall was recorded at this station for the month of January and the annual total. Table M-8 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Rocklin station.

Weather data available at the Auburn station covers the period from January 1, 1914, to December 31, 2001. The monthly average maximum temperature ranged from 53.8EF in January to 92.5EF in July, with an annual average maximum of 72.3EF. The monthly average minimum temperature ranged from 36.2EF in January to 61.6EF in July, with an annual average minimum of 48.1EF. Monthly average total precipitation ranged from 0.05 inches in July to 6.51 inches in January, with an annual average total of 34.63 inches. No snowfall was recorded at this station. Table M-9 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Auburn station.

Weather data available at the Colfax station covers the period from July 1, 1948, to December 31, 2001. The monthly average maximum temperature ranged from 54.3EF in January to 90.9EF in July, with an annual average maximum of 71.0EF. The monthly average minimum temperature ranged from 34.6EF in January to 61.7EF in July, with an annual average minimum of 46.4EF. Monthly average total precipitation ranged from 0.12 inches in July to 8.98 inches in January, with an annual average total of 48.23 inches. No snowfall was recorded at this station. Table M-10 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Colfax station.

Weather data available at the Georgetown Ranger station covers the period from July 1, 1948, to December 31, 2001. The monthly average maximum temperature ranged from 52.2EF in January to 89.1EF in August, with an annual average maximum of 69.9EF. The monthly average minimum temperature ranged from 34.0EF in January and February to 60.4EF in July, with an

annual average minimum of 45.5EF. Monthly average total precipitation ranged from 0.14 inches in July to 10.49 inches in January, with an annual average total of 52.41 inches. Average snowfall varied from 0.1 inch in May to 6.0 inches in January, with no snow recorded between June and October at this station. Table M-11 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Georgetown Ranger station.

Weather data available at the Placerville station covers the period from January 1, 1915, to December 31, 2001. The monthly average maximum temperature ranged from 53.0EF in January to 92.2EF in July, with an annual average maximum of 71.0EF. The monthly average minimum temperature ranged from 32.0EF in January and February to 56.2EF in July, with an annual average minimum of 43.1EF. Monthly average total precipitation ranged from 0.08 inches in July to 7.14 inches in January, with an annual average total of 38.63 inches. Average snowfall varied from 0.4 inch in February, April, and December to 1.4 inches in January, with no snow recorded between May and November at this station. Table M-12 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Placerville station.

Weather data available at the Sacramento FAA Airport station covers the period from January 1, 1941, to December 31, 2001. The monthly average maximum temperature ranged from 53.1EF in January to 92.8EF in July, with an annual average maximum of 73.6EF. The monthly average minimum temperature ranged from 37.8EF in January and February to 58.0EF in July, with an annual average minimum of 48.0EF. Monthly average total precipitation ranged from 0.03 inches in July to 3.75 inches in January, with an annual average total of 17.20 inches. No snow was recorded at this station. Table M-13 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Sacramento FAA Airport station.

Weather data available at the Sacramento 5 ESE station covers the period from January 1, 1890, to December 31, 2001. The monthly average maximum temperature ranged from 53.2EF in January to 91.4EF in July, with an annual average maximum of 72.8EF. Monthly average minimum temperature ranged from 39.5EF in January to 59.0EF in July, with an annual average minimum of 49.7EF. Monthly average total precipitation ranged from 0.01 inches in July to 3.73 inches in January, with an annual average total of 18.14 inches. No snow was recorded at this station. Table M-14 lists the monthly variation of average maximum and minimum temperatures, the average total precipitation, and the average total snowfall at the Sacramento 5 ESE station.

Table M-7: Monthly Climate Summary, Folsom Dam Station (October 26, 1955 – April 30,1993)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	53.7	60.2	64.0	70.6	79.4	88.0	94.5	93.3	88.0	78.2	64.0	54.6	74.1
Tmin	37.9	41.9	44.2	46.9	51.2	56.7	60.3	59.8	57.4	52.9	44.8	38.7	49.4
Rain	4.43	3.82	3.92	1.91	0.63	0.24	0.09	0.11	0.46	1.47	3.36	3.48	23.92
Snow	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

Source: WRCC Web Site 2002.

Table M-8: Monthly Climate Summary, Rocklin Station (July 1, 1948 – June 30, 1976)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	52.9	59.0	63.5	70.9	80.2	89.5	97.2	95.8	90.2	78.3	64.2	53.7	74.6
Tmin	33.3	36.5	38.7	42.0	47.8	53.5	57.6	56.6	52.7	45.3	38.8	34.5	44.8
Rain	4.74	3.29	2.98	1.82	0.51	0.21	0.07	0.06	0.26	1.36	3.16	3.82	22.27
Snow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WRCC Web Site 2002.

Table M-9: Monthly Climate Summary, Auburn Station (January 1, 1914 – December 31, 2001)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	53.8	58.4	61.7	68.1	76.1	85.1	92.5	91.5	86.2	76.4	62.8	54.7	72.3
Tmin	36.2	39.2	41.0	44.7	49.9	56.3	61.6	60.8	57.2	50.7	42.5	36.8	48.1
Rain	6.51	6.12	5.25	2.80	1.21	0.37	0.05	0.08	0.47	1.89	4.18	5.72	34.63
Snow	0.5	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.3

Source: WRCC Web Site 2002.

Table M-10: Monthly Climate Summary, Colfax Station (July 1, 1948 – December 31, 2001)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	54.3	57.2	59.7	66.4	73.9	83.3	90.9	89.9	84.9	74.8	61.3	55.1	71.0
Tmin	34.6	36.8	38.4	42.5	48.1	55.6	61.7	60.2	55.9	48.1	39.8	35.0	46.4
Rain	8.98	7.67	7.24	3.62	1.72	0.61	0.12	0.20	0.78	2.68	6.60	8.00	48.23
Snow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WRCC Web Site 2002.

Table M-11: Monthly Climate Summary, Georgetown Ranger Station (July 1, 1948 – December 31, 2001)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	52.2	53.4	58.0	65.0	71.9	80.5	88.8	89.1	83.5	73.2	59.2	52.8	69.0
Tmin	34.0	34.0	37.3	41.3	47.0	53.8	60.4	60.0	55.9	48.4	39.1	34.5	45.5
Rain	10.49	7.93	7.68	4.34	1.81	0.67	0.14	0.20	0.79	2.88	6.97	8.52	52.41
Snow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WRCC Web Site 2002.

Table M-12: Monthly Climate Summary, Placerville Station (January 1, 1915 – December 31, 2001)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	53.0	56.8	59.9	66.4	74.3	83.4	92.2	91.2	85.5	74.5	60.9	53.8	71.0
Tmin	32.0	34.6	36.9	40.2	45.4	51.2	56.2	55.5	51.5	44.2	36.8	32.5	43.1
Rain	7.14	6.80	5.82	3.09	1.52	0.46	0.08	0.09	0.58	2.15	4.57	6.34	38.63
Snow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WRCC Web Site 2002.

Table M-13: Monthly Climate Summary, Sacramento FAA Airport Station (January 1, 1941 – December 31, 2001)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	53.1	59.7	64.4	71.7	79.8	87.2	92.8	91.5	87.6	77.9	63.6	53.5	73.6
Tmin	37.8	41.1	42.9	45.9	50.5	55.2	58.0	57.7	55.8	50.2	42.6	38.0	48.0
Rain	3.75	3.12	2.38	1.13	0.46	0.16	0.03	0.066	0.29	0.90	2.13	2.79	17.20
Snow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WRCC Web Site 2002.

Table M-14: Monthly Climate Summary, Sacramento 5 ESE Station (January 1, 1980 – December 31, 2001)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Tmax	53.2	59.5	64.6	71.0	77.9	85.6	91.4	90.3	86.0	76.6	64.0	53.9	72.8
Tmin	39.5	43.1	45.6	48.4	52.4	56.7	59.0	58.5	56.9	51.6	44.4	39.8	49.7
Rain	3.73	3.22	2.66	1.40	0.61	0.16	0.01	0.03	0.31	0.93	2.01	3.07	18.14
Snow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WRCC Web Site 2002.

Air Quality

Both the State and federal governments have established health-based AAQS for six air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are designed to protect public health and welfare with a reasonable margin of safety.

In addition to primary and secondary AAQS, the State of California has established a set of episode criteria for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter. These criteria refer to episode levels, periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. The following paragraphs briefly describe the adverse health effects of the six criteria pollutants that may have potential health effects on outdoor use at the Unit.

The Unit is located within the following three counties: Sacramento, Placer, and El Dorado. It is also located within two air basins: the Mountain Counties Air Basin (El Dorado County) and the Sacramento Valley Air Basin (Sacramento and Placer Counties). Air quality in the Mountain County Air Basin portion of El Dorado County is administered by the El Dorado County Air Pollution Control District (EDCAPCD). Air quality in the Sacramento Valley Air Basin portion of Placer County is administered by the Placer County Air Pollution Control District (PCAPCD). Air quality in Sacramento County is administered by the Sacramento Metropolitan Air Quality Management District (SMAQMD).

California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are listed in Table M-15. Health effects of these criteria pollutants are listed in Table M-16.

Regional Air Quality

The air quality attainment plans prepared by each of the three air districts contain district-wide control measures to reduce carbon monoxide and ozone precursor emissions. The State standards for these pollutants are more stringent than the national standards.

Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights, or hot, sunny summer afternoons. As is true throughout much of the U.S., motor vehicle use is projected to increase substantially in the region. While improving emissions control technology means individual vehicles will contribute substantially fewer pollutants to regional air quality, this decrease in emissions from individual vehicles is not expected to eliminate an overall increase in regional air emissions.

The Air Resources Board (ARB) is required to designate areas of the State as attainment, nonattainment, or unclassified for any State standard. An “Attainment” designation for an area signifies that pollutant concentrations in that area did not violate the pollutant standard. A “Nonattainment” designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An “Unclassified” designation signifies that data do not support either an

attainment or nonattainment status. The California Clean Air Act (CCAA) divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The EPA designates areas for ozone (O_3), carbon monoxide (CO), and nitrogen dioxide (NO_2) as either "Does not meet the primary standards," "Cannot be classified," or "Better than national standards." For sulfur dioxide (SO_2), areas are designated as "Does not meet the primary standards," "Does not meet the secondary standards," "Cannot be classified," or "Better than national standards." In 1991, new nonattainment designations were assigned to areas that had previously been classified as Group I, II, or III for PM_{10} based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "Unclassified."

On July 18, 1997, the EPA issued new NAAQS for O_3 and particulate matter. The new NAAQS for O_3 is 0.08 ppm averaged over eight hours. The EPA also established the new $PM_{2.5}$ standards (particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 microns): annual average of 15 micrograms per cubic meter, 24 hour average of 65 micrograms per cubic meter, and essentially the same PM_{10} standards.

Attainment Status

El Dorado County

The Mountain Counties Air Basin (MCAB) portion of El Dorado County is classified as follows: ozone is listed as severe nonattainment for the federal standard and nonattainment for the State standard; carbon monoxide, sulfur dioxide, and nitrogen dioxide are in attainment or unclassified for both the federal and State standards; and PM_{10} is listed as unclassified for the federal standard and nonattainment for the State standard. Sulfates, lead, and hydrogen sulfide are in attainment with State standards, and visibility reducing particulates are unclassified. Although the EPA has promulgated new $PM_{2.5}$ standards, areas have not been designated for the attainment/nonattainment status for these new standards.

Placer County

The Placer County portion of the Sacramento Valley Air Basin (SVAB), which is outside of the Sacramento urbanized area is classified as follows: ozone is listed as serious nonattainment for the federal and the State standards, and is currently being evaluated and reclassified as severe nonattainment to be in attainment in 2005; carbon monoxide, sulfur dioxide, and nitrogen dioxide are in attainment with both the federal and State standards; and PM_{10} is listed as attainment for the federal standard and nonattainment for the State standard. Sulfates, lead, and hydrogen sulfide are in attainment with State standards, and visibility reducing particulates are unclassified. Although the EPA has promulgated new $PM_{2.5}$ standards, areas have not been designated for the attainment/nonattainment status for these new standards. The urbanized area of Sacramento is designated a CO maintenance area.

Table M-15: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[2,5]	Secondary[2,6]	Method[7]
Ozone (O3)	1 Hour	0.09 ppm (180 µg/m3)	Ultraviolet Photometry	0.12 ppm (235 µg/m3)8	Same as Primary Standard	Ethylene Chemi-luminescence
	8 Hour	–		0.08 ppm (157 µg/m3)		
Respirable Particulate Matter (PM10)	Annual Geometric Mean	30 µg/m3	Size Selective Inlet Sampler ARB Method P (8/22/85)	–	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	24 Hour	50 µg/m3		150 µg/m3		
	Annual Arithmetic Mean	–		50 µg/m3		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		65 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean			15 µg/m3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m3)	Non-dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m3)	None	Non-dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m3)		35 ppm (40 mg/m3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m3)		–		
Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	–	Gas Phase Chemi-luminescence	0.053 ppm (100 µg/m3)	Same as Primary Standard	Gas Phase Chemi-luminescence
	1 Hour	0.25 ppm (470 µg/m3)		–		
Lead	30 days average	1.5 µg/m3	AIHL Method 54 (12/74) Atomic Absorption	–	–	High Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m3	Same as Primary Standard	
Sulfur Dioxide (SO2)	Annual Arithmetic Mean	–	Fluorescence	0.030 ppm (80 µg/m3)	–	Pararosoaniline
	24 Hour	0.04 ppm (105 µg/m3)		0.14 ppm (365 µg/m3)	–	
	3 Hour	–		–	0.5 ppm (1300 µg/m3)	
	1 Hour	0.25 ppm (655 µg/m3)		–	–	
Visibility Reducing Particles	8 Hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer, visibility of ten miles or more (0.07–30 miles or more for Lake Tahoe), due to particles when the relative humidity is less than 70 percent. Method: ARB Method V (8/18/89).		**No Federal Standards**		
Sulfates	24 Hour	25 µg/m3	Turbidimetric Barium Sulfate-AIHL Method 61 (2/76)			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m3)	Cadmium Hydroxide Stratum			

Source: California Air Resources Board (1/25/99)

Footnotes:

[1] California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1 and 24 hour); nitrogen dioxide; suspended particulate matter (PM10), and visibility reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

In addition, Section 70200.5 lists vinyl chloride (chloroethene) under "Ambient Air Quality Standards for Hazardous Substances." In 1978, the California Air Resources Board (ARB) adopted the vinyl chloride standard of 0.010 ppm (26 $\mu g/m^3$) averaged over a 24 hour period and measured by gas chromatography. The standard notes that vinyl chloride is a "known human and animal carcinogen" and that "low-level effects are undefined, but are potentially serious. Level is not a threshold level and does not necessarily protect against harm. Level specified is lowest level at which violation can be reliably detected by the method specified. Ambient concentrations at or above the standard constitute an endangerment to the health of the public."

In 1990, the ARB identified vinyl chloride as a Toxic Air Contaminant and determined that there was not sufficient available scientific evidence to support the identification of a threshold exposure level. This action allows the implementation of health-protective control measures at levels below the 0.010 ppm ambient concentration specified in the 1978 standard.

[2] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25EC and a reference pressure of 760 mm of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25EC and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure that can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8] New federal eight hour ozone and fine particulate matter standards were promulgated by U.S. EPA on July 18, 1997. The federal one hour ozone standard continues to apply in areas that violated the standard. Contact U.S. EPA for further clarification and current federal policies.

Table M-16: Health Effects Summary of the Major Criteria Pollutants

Pollutants	Sources	Primary Effects
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight	• Aggravation of respiratory and cardiovascular diseases • Irritation of eyes • Impairment of cardiopulmonary function • Plant leaf injury
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust • High-temperature stationary combustion • Atmospheric reactions	• Aggravation of respiratory illness • Reduced visibility • Reduced plant growth • Formation of acid rain
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust • Natural events, such as decomposition of organic matter	• Reduced tolerance of exercise • Impairment of mental function • Impairment of fetal development • Death of high levels of exposure • Aggravation of some heart diseases (angina)
Suspended Particulate Matter (PM_{10})	• Stationary combustion of solid fuels • Construction activities • Industrial processes • Atmospheric chemical reactions	• Reduced lung function • Aggravation of the effects of gaseous pollutants • Aggravation of respiratory and cardio-respiratory diseases • Increased cough and chest discomfort • Soiling • Reduced visibility
Sulfur Dioxide (SO2)	• Combustion of sulfur-containing fossil fuels • Smelting of sulfur-bearing metal ores • Other industrial processes	• Aggravation of respiratory diseases • Reduced lung function • Irritation of eyes • Reduced visibility • Plant injury • Deterioration of metals, textiles, leather, finishes, coatings, etc.
Lead	• Contaminated soil	• Impairment of blood function and nerve construction • Behavioral and hearing problems in children

Source: California Air Resource Board (ARB) 2000.

Sacramento County

The Sacramento County portion of the Sacramento Valley Air Basin (SVAB), which is within the Sacramento urbanized area is classified as follows: ozone is listed as serious nonattainment for the federal standard and nonattainment for the State standard; carbon monoxide, sulfur dioxide, and nitrogen dioxide are in attainment with both the federal and State standards; and PM_{10} is listed as nonattainment for both federal and State standards. Sulfates, lead, and hydrogen sulfide are in attainment with State standards, and visibility reducing particulates are unclassified. Although the EPA has promulgated new $PM_{2.5}$ standards, areas have not been designated for the attainment/nonattainment status for these new standards. The urbanized area of Sacramento is designated a CO maintenance area.

Air Quality in the Unit Vicinity

The major pollutants of concern in the vicinity of the Unit—ozone, carbon monoxide, and particulate matter—are monitored at a number of locations. Air quality monitoring stations in the Unit vicinity, include: Folsom-Natoma Street, Auburn-Dewitt-C Avenue, Colfax-City Hall, Roseville-N. Sunrise Boulevard, Placerville-Gold Nugget, and Rocklin-Rocklin Road. The Folsom-Natoma Street monitoring station measures ozone and NO_2 levels. The Auburn-Dewitt-C Avenue and Colfax-City Hall monitoring stations measure ozone only. The Roseville-N. Sunrise monitoring station monitors CO, ozone, NO_2, $PM_{2.5}$, and PM_{10} levels. The Placerville-Gold Nugget monitoring station monitors CO, ozone, NO_2, and PM_{10} levels. The Rocklin-Rocklin Road monitoring station monitors ozone and PM_{10} levels.

Pollutant monitoring results for the years 1999 to 2001 at these monitoring stations indicate that air quality in the Unit area has generally been good. Tables M-17A through M-22B summarize the last three years of published data from these monitoring stations.

As indicated in these tables, ozone and PM_{10} are the only two criteria pollutants that have exceeded the State and/or federal standards in the past three years at these monitoring stations.

PM_{10} levels, monitored at the Roseville-N Sunrise Boulevard station, have been improving in the past three years, with one to three days exceeding the State's PM_{10} standard, but did not exceed the federal PM_{10} standard. $PM_{2.5}$ levels monitored at this station exceeded the federal standard once in 1999 but have not exceeded the federal standard since 2000.

PM_{10} levels monitored at the Placerville-Gold Nugget Way station exceeded the State standard once in 2001 but did not exceed the federal PM_{10} standard in the past three years. $PM_{2.5}$ levels were not monitored at this station.

PM_{10} levels monitored at the Rocklin-Rocklin Road station exceeded the State standard from zero to four days in the past three years but did not exceed the federal standard. $PM_{2.5}$ levels were not monitored at this station.

Health impacts arising from exposure to significant levels of particulate matter could include reduced lung function, aggravation of the effects of gaseous pollutants, aggravation of respiratory and cardio-respiratory diseases, and increased cough and chest discomfort. Based on

the monitored PM_{10} and $PM_{2.5}$ data in the Unit vicinity, suspended particulate would not create significant health impacts for Unit visitors.

One-hour and eight-hour ozone levels exceeded both State and federal standards at the following stations: Folsom-Natoma Street, Auburn-Dewitt-C Avenue, Colfax-City Hall, Roseville-N Sunrise Boulevard, Placerville-Gold Nugget Way, and Rocklin-Rocklin Road. In the past few years, ozone levels have been considered moderate and the ozone levels have been decreasing. However, ozone levels that continue to exceed both State and federal standards pose certain health concerns for Unit visitors. Health impacts arising from exposure to significant levels of ozone pollutant could include aggravation of respiratory and cardiovascular diseases, irritation of the eyes, and impairment of cardiopulmonary function. In the foreseeable future, ozone levels in the Unit vicinity are expected to continue to exceed both State and federal standards, therefore, Unit visitors will continue to be exposed to the potentially harmful effects of this criteria pollutant.

Table M-17A: Ambient Air Quality at Folsom-Natoma Street Air Monitoring Station

	One Hour Carbon Monoxide		One Hour Ozone		Coarse Suspended Particulate (PM_{10})		Nitrogen Dioxide	
	Max. 1 Hour Conc. (ppm)[4]	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	> 20 ppm/1 hr		> .09 ppm/1 hr		> 50 μg/m3, 24 hrs		> .25 ppm/1 hr	
2001	ND[5]	ND	0.13	27	ND	ND	0.10	0
2000	ND	ND	0.13	17	ND	ND	0.05	0
1999	ND	ND	0.15	22	ND	ND	0.07	0
MAXIMUM	**ND**		**0.15**		**ND**		**0.10**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 μg/m3, 24 hrs		0.053 ppm, annual average	
2001	ND	ND	0.13	2	ND	ND	0.008	0
2000	ND	ND	0.13	1	ND	ND	ND	0
1999	ND	ND	0.15	4	ND	ND	0.010	0
MAXIMUM	**ND**		**0.15**		**ND**		**0.010**	

Source: CARB and EPA 1999 to 2001.

ppm = parts per million

μg/m3 = microgram of pollutant per cubic meter of air

[4]Data taken from EPA Web site; others taken from CARB Web site.

[5]No data available at this monitoring station.

Table M-17B: Ambient Air Quality at Folsom-Natoma Street Air Monitoring Station

	Eight Hour Carbon Monoxide		Eight Hour Ozone		Fine Suspended Particulate (PM2.5)		Sulfur Dioxide	
	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 24 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	. 9.0 ppm/8 hr		No State Standard		No State Standard		> .04 ppm/24 hr	
2001	ND[6]	ND	0.11	NA[7]	ND	ND	ND	ND
2000	ND	ND	0.10	NA	ND	ND	ND	ND
1999	ND	ND	0.13	NA	ND	ND	ND	ND
MAXIMUM	**ND**		**0.13**		**ND**		**ND**	
Federal Stds.	. 9.0 ppm/8 hr		> .08 ppm/8 hr		> 65 µg/m3, 24 hrs		0.14 ppm/24 hr	
2001	ND	ND	0.11	19	ND	ND	ND	ND
2000	ND	ND	0.10	15	ND	ND	ND	ND
1999	ND	ND	0.13	18	ND	ND	ND	ND
MAXIMUM	**ND**		**0.13**		**ND**		**ND**	

Source: CARB 1999 to 2001.

[6]No data available at this monitoring station.

[7]No State standard to compare to.

Table M-18A: Ambient Air Quality at Auburn-Dewitt-C Avenue Air Monitoring Station

	One Hour Carbon Monoxide		One Hour Ozone		Coarse Suspended Particulate (PM10)		Nitrogen Dioxide	
	Max. 1 Hour Conc. (ppm)[8]	**Number of Days Exceeded**	**Max. 1 Hour Conc. (ppm)**	**Number of Days Exceeded**	**Max. 24 Hour Conc. ($\mu g/m^3$)**	**Number of Days Exceeded**	**Max. 1 Hour Conc. (ppm)**	**Number of Days Exceeded**
State Stds.	> 20 ppm/1 hr		> .09 ppm/1 hr		> 50 µg/m3, 24 hrs		> .25 ppm/1 hr	
2001	ND[9]	ND	0.04	0	ND	ND	ND	ND
2000	ND	ND	0.12	22	ND	ND	ND	ND
1999	ND	ND	0.14	24	ND	ND	ND	ND
MAXIMUM	**ND**		**0.14**		**ND**		**ND**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 µg/m3, 24 hrs		0.053 ppm, annual average	
2001	ND	ND	0.04	0	ND	ND	ND	ND
2000	ND	ND	0.12	0	ND	ND	ND	ND
1999	ND	ND	0.14	2	ND	ND	ND	ND
MAXIMUM	**ND**		**0.14**		**ND**		**ND**	

Source: CARB and EPA 1999 to 2001.

[8]Data taken from EPA Web site; others taken from CARB Web site.

[9]No data available at this monitoring station.

Table M-18B: Ambient Air Quality at Auburn-Dewitt-C Avenue Air Monitoring Station

	Eight Hour Carbon Monoxide		Eight Hour Ozone		Fine Suspended Particulate (PM2.5)		Sulfur Dioxide	
	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 24 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	. 9.0 ppm/8 hr		No State Standard		No State Standard		> .04 ppm/24 hr	
2001	ND	ND	0.03	NA[10]	ND[11]	ND	ND	ND
2000	ND	ND	0.11	NA	ND	ND	ND	ND
1999	ND	ND	0.11	NA	ND	ND	ND	ND
MAXIMUM	**ND**		**0.11**		**ND**		**ND**	
Federal Stds.	. 9.0 ppm/8 hr		> .08 ppm/8 hr		> 65 µg/m3, 24 hrs		0.14 ppm/24 hr	
2001	ND	ND	0.03	0	ND	ND	ND	ND
2000	ND	ND	0.11	17	ND	ND	ND	ND
1999	ND	ND	0.11	25	ND	ND	ND	ND
MAXIMUM	**ND**		**0.11**		**ND**		**ND**	

Source: CARB 1999 to 2001.

[10] No State standard to compare to.

[11] No data available at this monitoring station.

Table M-19A: Ambient Air Quality at Colfax-City Hall Air Monitoring Station

	One Hour Carbon Monoxide		One Hour Ozone		Coarse Suspended Particulate (PM10)		Nitrogen Dioxide	
	Max. 1 Hour Conc. (ppm)[12]	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	> 20 ppm/1 hr		> .09 ppm/1 hr		> 50 µg/m3, 24 hrs		> .25 ppm/1 hr	
2001	ND[13]	ND	ND	ND	ND	ND	ND	ND
2000	ND	ND	0.12	10	ND	ND	ND	ND
1999	ND	ND	0.16	9	ND	ND	ND	ND
MAXIMUM	**ND**		**0.16**		**ND**		**ND**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 µg/m3, 24 hrs		0.053 ppm, annual average	
2001	ND	ND	ND	ND	ND	ND	ND	ND
2000	ND	ND	0.12	0	ND	ND	ND	ND
1999	ND	ND	0.16	1	ND	ND	ND	ND
MAXIMUM	**ND**		**0.16**		**ND**		**ND**	

Source: CARB and EPA 1999 to 2001.

[12]Data taken from EPA Web site; others taken from CARB Web site.

[13]No data available at this monitoring station.

Table M-19B: Ambient Air Quality at Colfax-City Hall Air Monitoring Station

	Eight Hour Carbon Monoxide		Eight Hour Ozone		Fine Suspended Particulate (PM2.5)		Sulfur Dioxide	
	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 24 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	. 9.0 ppm/8 hr		No State Standard		No State Standard		> .04 ppm/24 hr	
2001	ND[14]	ND	ND	NA[15]	ND	NA	ND	ND
2000	ND	ND	0.10	NA	ND	NA	ND	ND
1999	ND	ND	0.09	NA	ND	NA	ND	ND
MAXIMUM	**ND**		**0.10**				**ND**	
Federal Stds.	. 9.0 ppm/8 hr		> .08 ppm/8 hr		> 65 µg/m3, 24 hrs		0.14 ppm/24 hr	
2001	ND	ND	ND	ND	ND	ND	ND	ND
2000	ND	ND	0.10	5	ND	ND	ND	ND
1999	ND	ND	0.09	9	ND	ND	ND	ND
MAXIMUM	**ND**		**0.10**		**ND**		**ND**	

Source: CARB 1999 to 2001.

[14]No data available at this monitoring station.

[15]No State standard to compare to.

Table M-20A: Ambient Air Quality at Roseville-N Sunrise Blvd Air Monitoring Station

	One Hour Carbon Monoxide		One Hour Ozone		Coarse Suspended Particulate (PM10)		Nitrogen Dioxide	
	Max. 1 Hour Conc. (ppm)[16]	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	> 20 ppm/1 hr		> .09 ppm/1 hr		> 50 µg/m3, 24 hrs		> .25 ppm/1 hr	
2001	3.1	0	0.12	13	59	3	0.09	0
2000	3.2	0	0.13	13	58	1	0.08	0
1999	3.9	0	0.14	14	89	4	0.09	0
MAXIMUM	**3.9**		**0.14**		**89**		**0.09**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 µg/m3, 24 hrs		0.053 ppm, annual average	
2001	3.1	0	0.12	0	59	0	0.015	0
2000	3.2	0	0.13	1	58	0	0.016	0
1999	3.9	0	0.14	2	89	0	0.012	0
MAXIMUM	**3.9**		**0.14**		**89**		**0.016**	

Source: CARB and EPA 1999 to 2001.

ppm = parts per million

µg/m3 = microgram of pollutant per cubic meter of air

[16]Data taken from EPA Web site; others taken from CARB Web site.

Table M-20B: Ambient Air Quality at Roseville-N Sunrise Blvd Air Monitoring Station

	Eight Hour Carbon Monoxide		Eight Hour Ozone		Fine Suspended Particulate (PM2.5)		Sulfur Dioxide	
	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 24 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	. 9.0 ppm/8 hr		No State Standard		No State Standard		> .04 ppm/24 hr	
2001	1.90	0	0.10	NA[17]	49	NA	ND[18]	ND
2000	2.36	0	0.10	NA	51	NA	ND	ND
1999	2.24	0	0.11	NA	79	NA	ND	ND
MAXIMUM	**2.36**		**0.11**		**79**		**ND**	
Federal Stds.	. 9.0 ppm/8 hr		> .08 ppm/8 hr		> 65 µg/m3, 24 hrs		0.14 ppm/24 hr	
2001	1.90	0	0.10	9	49	0	ND	ND
2000	2.36	0	0.10	8	51	0	ND	ND
1999	2.34	0	0.11	9	79	1	ND	ND
MAXIMUM	**2.36**		**0.11**		**79**		**ND**	

Source: CARB 1999 to 2001.

[17]No State standard to compare to.

[18]No data available at this monitoring station.

Table M-21A: Ambient Air Quality at Placerville-Gold Nugget Way Air Monitoring Station

	One Hour Carbon Monoxide		One Hour Ozone		Coarse Suspended Particulate (PM10)		Nitrogen Dioxide	
	Max. 1 Hour Conc. (ppm)[19]	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	> 20 ppm/1 hr		> .09 ppm/1 hr		> 50 µg/m3, 24 hrs		> .25 ppm/1 hr	
2001	1.0	0	0.12	17	52	1	0.09	0
2000	2.7	0	0.12	19	38	0	0.08	0
1999	1.4	0	0.13	21	49	0	0.09	0
MAXIMUM	**2.7**		**0.13**		**52**		**0.09**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 µg/m3, 24 hrs		0.053 ppm, annual average	
2001	1.0	0	0.12	0	52	0	0.015	0
2000	2.7	0	0.12	0	38	0	0.016	0
1999	1.4	0	0.13	2	49	0	0.012	0
MAXIMUM	**2.7**		**0.13**		**52**		**0.016**	

Source: CARB and EPA 1999 to 2001.

ppm = parts per million

Fg/m3 = microgram of pollutant per cubic meter of air

[19] Data taken from EPA Web site; others taken from CARB Web site.

Table M-21B: Ambient Air Quality at Placerville-Gold Nugget Air Monitoring Station

	Eight Hour Carbon Monoxide		Eight Hour Ozone		Fine Suspended Particulate (PM2.5)		Sulfur Dioxide	
	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 24 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	. 9.0 ppm/8 hr		No State Standard		No State Standard		> .04 ppm/24 hr	
2001	0.84	0	0.10	NA20	ND[21]	NA	ND	ND
2000	0.96	0	0.10	NA	ND	NA	ND	ND
1999	0.88	0	0.12	NA	ND	NA	ND	ND
MAXIMUM	**0.96**		**0.12**		**ND**		**ND**	
Federal Stds.	. 9.0 ppm/8 hr		> .08 ppm/8 hr		> 65 µg/m3, 24 hrs		0.14 ppm/24 hr	
2001	0.84	0	0.10	15	ND	ND	ND	ND
2000	0.96	0	0.10	15	ND	ND	ND	ND
1999	0.88	0	0.12	23	ND	ND	ND	ND
MAXIMUM	**0.96**		**0.12**		**ND**		**ND**	

Source: CARB 1999 to 2001.

[20]No State standard to compare to.

[21]No data available at this monitoring station.

Table M-22A: Ambient Air Quality at Rocklin-Rocklin Road Air Monitoring Station

	One Hour Carbon Monoxide		One Hour Ozone		Coarse Suspended Particulate (PM10)		Nitrogen Dioxide	
	Max. 1 Hour Conc. (ppm)[22]	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 1 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	> 20 ppm/1 hr		> .09 ppm/1 hr		> 50 µg/m3, 24 hrs		> .25 ppm/1 hr	
2001	ND[23]	ND	0.13	18	57	2	ND	ND
2000	ND	ND	0.12	16	46	0	ND	ND
1999	ND	ND	0.13	17	75	4	ND	ND
MAXIMUM	**ND**		**0.13**		**75**		**ND**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 µg/m3, 24 hrs		0.053 ppm, annual average	
2001	ND	ND	0.13	1	57	0	ND	ND
2000	ND	ND	0.12	0	46	0	ND	ND
1999	ND	ND	0.13	3	75	0	ND	ND
MAXIMUM	**ND**		**0.13**		**75**		**ND**	

Source: CARB and EPA 1999 to 2001.

ppm = parts per million

µg/m3 = microgram of pollutant per cubic meter of air

[22]Data taken from EPA Web site; others taken from CARB Web site.

[23]No data available at this monitoring station.

Table M-22B: Ambient Air Quality at Rocklin-Rocklin Road Air Monitoring Station

	Eight Hour Carbon Monoxide		Eight Hour Ozone		Fine Suspended Particulate (PM2.5)		Sulfur Dioxide	
	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 8 Hour Conc. (ppm)	Number of Days Exceeded	Max. 24 Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. 24 Hour Conc. (ppm)	Number of Days Exceeded
State Stds.	. 9.0 ppm/8 hr		No State Standard		No State Standard		> .04 ppm/24 hr	
2001	ND[24]	ND	0.10	NA[25]	ND	NA	ND	ND
2000	ND	ND	0.10	NA	ND	NA	ND	ND
1999	ND	ND	0.11	NA	ND	NA	ND	ND
MAXIMUM	**ND**		**0.11**		**ND**		**ND**	
Federal Stds.	. 9.0 ppm/8 hr		> .08 ppm/8 hr		> 65 µg/m3, 24 hrs		0.14 ppm/24 hr	
2001	ND	ND	0.10	8	ND	ND	ND	ND
2000	ND	ND	0.10	12	ND	ND	ND	ND
1999	ND	ND	0.11	11	ND	ND	ND	ND
MAXIMUM	**ND**		**0.11**		**ND**		**ND**	

Source: CARB 1999 to 2001.

[24]No data available at this monitoring station.

[25]No State standard to compare to.

Regulatory Framework

The three air districts are primarily responsible for regulating air pollution emissions from stationary sources (e.g., factories) and from indirect sources (e.g., traffic associated with new development) and for monitoring ambient pollutant concentrations. Indirect sources are facilities that do not have equipment that directly emits substantial amounts of pollution, but that attract large numbers of mobile sources of pollution. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB) and the EPA.

Federal Clean Air Act of 1970 (CAA)

The CAA authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The Federal Clean Air Act Amendments of 1990 (1990 CAAA) made major changes in deadlines for attaining NAAQS and in the actions required for areas that exceeded these standards. Under the CAA, State and local agencies in areas that exceed the NAAQS are required to develop State implementation plans (SIPs) to show how they will achieve the NAAQS by specific dates.

California Clean Air Act (CCAA)

The CCAA, 1988, requires that all air districts in the State endeavor to achieve and maintain CAAQS for O_3, CO, SO_2, and NO_2 by the earliest practical date. Plans for attaining CAAQS were submitted to the ARB by regional air districts on a staggered time schedule in 1991, 1994, 1997, and 2000.

The CCAA mandates that districts focus particular attention on reducing emissions from transportation and areawide emission sources and provides districts with new authority to regulate indirect sources. Each district plans to achieve a five percent annual reduction, averaged over consecutive three year periods, in districtwide emissions of each nonattainment pollutant or its precursors. Substantial new growth within the region tends to impede the achievement of air emission reduction goals to the extent that additional vehicle miles are logged on the region's highways.

A strict interpretation of the reduction goals suggests that any general development that increases traffic within the region, no matter how large or small, would have a significant, Unit specific air quality impact unless the development related emissions are offset by concurrent emission reductions elsewhere within the airshed. For this reason, future planning at the Unit should consider both State and federal air quality plans and standards. This interpretation is not universal among jurisdictions because each air district has different rules based on its attainment status.

Thresholds of Significance

Placer County Air Pollution Control District

The PCAPCD has not established any emissions threshold for construction activities associated with a proposed project. Implementation of standard conditions and feasible

measures to minimize emissions during construction of the project is considered to have reduced the construction air quality impact to a less than significant level.

Project operation emissions refer to the pollutants generated by the stationary/area (direct) sources and mobile (indirect) sources. Stationary sources include electricity and natural gas consumption; mobile sources are the motor vehicle trips associated with the project. These sources would contribute to the deterioration of air quality and potentially delay the region from complying with the Clean Air Act. Hence, thresholds for pollutants are created to determine the significance of a project's impact on air quality. The thresholds of significance from operation are as follows:

Emissions Thresholds for Pollutants with Regional Effects

The following are emissions thresholds for project operations.

- 82 pounds per day of ROG
- 82 pounds per day of NO_X
- 82 pounds per day of PM_{10}
- 550 pounds per day of CO

Projects in the region with operation related emissions that exceed any of the above emission thresholds are considered significant by the PCAPCD.

Standards for Localized CO Impacts.

The following are the standards for CO concentrations.

- California State one hour CO standard of 20.0 ppm
- California State eight hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards.

If ambient CO levels already exceed the standards, a project is considered to have significant impacts if it contributes to measurable increases in the one hour or eight hour CO levels. The PCAPCD has not established any "measurable" threshold for CO concentration.

<u>El Dorado County Air Pollution Control District.</u>

The EDCAPCD has established emissions thresholds for construction activities associated with a proposed project similar to emissions associated with project operations.

Project operation emissions refer to the pollutants generated by the stationary/area (direct) sources and mobile (indirect) sources. Stationary sources include electricity and natural gas

consumption; mobile sources are the motor vehicle trips associated with the project. These sources would contribute to the deterioration of air quality and potentially delay the region from complying with the Clean Air Act. Hence, thresholds for pollutants are created to determine the significance of a project's impact on air quality. The thresholds of significance from operation are as follows:

Emissions Thresholds for Ozone

The following are emissions thresholds for ozone precursors pollutants.

- 82 pounds per day of ROG
- 82 pounds per day of NO_2

Projects in the region with operation related emissions that exceed any of the above emission thresholds are considered significant by the EDCAPCD.

Emissions Thresholds for Other Criteria Pollutants

For the other criteria pollutants, including CO, PM_{10}, SO_2, NO_2, sulfates, lead, and H_2S, a project is considered to have a significant impact on air quality if it will cause or contribute significantly to a violation of the applicable national or State ambient air quality standards. For example, the project would have a significant impact if it will result in the exceedance of the following standards:

- California State one hour CO standard of 20.0 ppm
- California State eight hour CO standard of 9.0 ppm

Significance Criteria for Visibility

A project in the MCAB portion of El Dorado County will be considered to have a significant impact on visibility if it will cause or contribute significantly to a violation of the State visibility standard, which is ten miles (when relative humidity is less than 70 percent).

Significance Criteria for Determining Cumulative Impacts

A proposed project is considered cumulatively significant if one or more of the following conditions is met:

1. The project requires a change in the existing land use designation (i.e., General Plan amendment, rezone), and projected emissions (ROG, NOx, CO, or PM_{10}) are greater than the emissions anticipated for the site if developed under the existing land use designation;

2. The project would individually exceed any significance criteria in the EDCAPCD guidelines;

3. For impacts that are determined to be significant under the EDCAPCD guidelines, the Lead Agency for the project does not require the project to implement the emission

reduction measures contained in and/or derived from the Air Quality Attainment Plan (AQAP); or

4. The project is located in a jurisdiction that does not implement the emission reduction measures contained in and/or derived from the AQAP.

Sacramento Metropolitan Air Quality Management District

The SMAQMD has established emissions thresholds for construction activities associated with a proposed project similar to emissions associated with project operations. The thresholds of significance from construction and operation are as follows:

Emissions Thresholds for Criteria Pollutants with Regional Effects.

The following are emissions thresholds for ozone precursors pollutants.

- 85 pounds per day of ROG
- 85 pounds per day of NO_X
- 275 pounds per day of PM_{10}

Projects in the region with operation related emissions that exceed any of the above emission thresholds are considered significant by the SMAQMD.

Standards for Carbon Monoxide Concentrations

A project is considered to have a significant impact on air quality if it will cause or contribute significantly to a violation of the CO national or State ambient air quality standards:

- California State one hour CO standard of 20.0 ppm
- California State eight hour CO standard of 9.0 ppm

Recommendations

Climatic data and air quality information for the region in which the Unit is located are described in the section. However, microclimatic characteristics in the Unit are not available at this time. When such information is available, it can be included in the section. The CDPR may want to consider establishing a weather data collection station or asking agencies that collect such information to do so for the Unit. This microclimate data would provide a more detailed account of the climatic conditions within the Unit.

Based on the monitored PM_{10} and $PM_{2.5}$ data in the Unit vicinity, no significant health impacts from suspended particulate would occur for people that use the facilities in the Unit. In the past few years, ozone levels have been considered moderate and ozone levels have been decreasing. However, ozone levels that continue to exceed both State and federal standards pose certain health concerns for Unit visitors. Health impacts arising from exposure to significant levels of ozone pollutant could include aggravation of respiratory and cardiovascular diseases, irritation of the eyes, and impairment of cardiopulmonary function. In the foreseeable future, ozone levels in the Unit vicinity are expected to continue to exceed both State and federal standards, therefore, Unit visitors will continue to be exposed to the potentially harmful effects of this criteria pollutant.

References

California Air Resources Board Website, www.arb.ca.gov

El Dorado County. *El Dorado County General Plan: Public Health, Safety and Noise Element,* 2000.

El Dorado County Air Pollution Control District. *Guide to Air Quality Assessment*, 2002.

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Sacramento County Air Quality Management District. *Air Quality Thresholds of Significance,* 1994.

Western Regional Climate Center (WRCC) Website, www.wrcc.dri.edu